WHAT IS CLAIMED IS:

1. A wavelength division multiplexed optical interconnection device comprising:

a plurality of optical signal input units each comprising a plurality of optical receivers for respectively receiving a plurality of pieces of light and converting said pieces of light into first electric signals, said optical signal input units being placed in L-shaped form or C-shaped form across sides adjacent to a peripheral portion of a main surface of a single square semiconductor;

a signal processing integrated circuit having a logic circuit for effecting a path switching process on the first electric signals delivered from said plurality of optical receivers and for generating second electric signals, said signal processing integrated circuit being placed in a central portion of the main surface of the semiconductor substrate; and

a plurality of optical signal output units each comprising a plurality of optical emitters for respectively converting the second electric signals generated by said signal processing integrated circuit into light, an optical multiplexer for wavelength-multiplexing the plurality of pieces of light emitted from the optical emitters, and fibers for transmitting the wavelength-multiplexed light

sent from the optical multiplexer to the outside, said optical signal output units being placed in inverted L-shaped form or C-shaped form so as to be opposite to the plurality of optical signal input units across the sides adjacent to the peripheral portion of the main surface of the semiconductor substrate.

2. The wavelength division multiplexed optical interconnection device according to claim 1, wherein optical receiver driver circuits for respectively driving the plurality of optical receivers are formed in a integrated fashion within the semiconductor substrate located below said plurality of optical signal input units, and optical emitter driver circuits for respectively driving the plurality of optical emitters are formed in an integrated fashion within the semiconductor substrate located below said plurality of optical signal output units.

3. The wavelength division multiplexed optical interconnection device according to claim 2, wherein said plurality of optical signal input units and said plurality of optical signal output units are placed symmetrically with respect to one another on the main surface of the semiconductor substrate.

4. The wavelength division multiplexed optical interconnection device according to claim 2, further including at least one phase-locked loop circuit placed

within the semiconductor substrate, for controlling the transfer of the second electric signals to said optical emitter driver circuits in liaison with the logic circuit for performing the signal-path switching process, and wherein said phase-locked loop circuit is integrally formed within the semiconductor substrate located below said plurality of optical signal output units.

5. The wavelength division multiplexed optical interconnection device according to claim 2, wherein said optical receiver driver circuits and said optical emitter driver circuits are respectively formed in an Si-Ge semiconductor region, and said signal processing integrated circuit comprises a CMOS circuit.

6. The wavelength division multiplexed optical interconnection device according to claim 2, wherein an insulating substrate is mounted to the bottom face of the semiconductor substrate, which is opposite to the main surface, and terminals for respectively supplying source voltages to said optical receiver driver circuits, said optical emitter driver circuits, and said signal processing integrated circuit are drawn out from the back of the insulating substrate.

7. The wavelength division multiplexed optical interconnection device according to claim 2, wherein said optical multiplexer is comprised of Lithium Niobate

Titanium, a glass waveguide, or organic polyimide.

8. A wavelength division multiplexed optical interconnection device comprising:

a substrate having a square surface and back;

a plurality of first optical signal transmission media provided on the left side of a peripheral surface of said substrate as viewed from the center line for dividing the peripheral surface of said substrate into two;

a plurality of optical demultiplexers for respectively wavelength-demultiplexing wavelength-multiplexed signals inputted via said first optical signal transmission media;

a plurality of optical receivers for respectively receiving the wavelength-demultiplexed plural optical signals therein and converting the same into first electric signals;

a plurality of first driver circuit units provided on the surface of said substrate in the neighborhood of said plurality of optical receivers and for respectively driving said plurality of optical receivers and amplifying the converted first electric signals to thereby output second electric signals;

a signal processing electronic circuit unit provided on a central surface of said substrate and for electrically processing the second electric signals to thereby output

third electric signals;

a plurality of optical emitters provided on the right side of the peripheral surface of said substrate as viewed from the center line thereof and for respectively converting the third electric signals outputted from said signal processing electronic circuit unit to optical signals;

a plurality of optical multiplexers for wavelength-multiplexing the optical signals;

a plurality of second optical signal transmission media for sending out the wavelength-multiplexed optical signals;

a plurality of second driver circuit units provided on the surface of said substrate in the neighborhood of said plurality of optical emitters and for respectively driving said plurality of optical emitters; and

a plurality of terminals provided on the back of said substrate,

wherein said plurality of first driver circuit units and said plurality of second driver circuit units are formed in an Si-Ge semiconductor region, said signal processing electronic circuit unit is comprised of a CMOS circuit, and source voltages for respectively operating said first driver circuit units, said signal processing electronic circuit unit and said second driver circuit

units are respectively supplied from said plurality of terminals provided on the back of said substrate.

9. The wavelength division multiplexed optical interconnection device according to claim 8, wherein the center line for dividing the surface into the two corresponds to a line for connecting the centers of opposite two sides of said substrate surface, said plurality of first optical signal transmission media, said plurality of optical demultiplexers, said plurality of optical receivers, and said plurality of first driver circuit units are provided in a C-shaped fashion over the periphery of said substrate, and said plurality of optical emitters, said plurality of optical multiplexers, said plurality of second optical signal transmission media and said plurality of second driver circuit units are provided in an inverted C-shaped fashion over the periphery of said substrate.

10. The wavelength division multiplexed optical interconnection device according to claim 8, wherein said plurality of first optical signal transmission media, said plurality of optical demultiplexers, said plurality of optical receivers, said plurality of optical emitters, said plurality of optical multiplexers, and said plurality of second optical signal transmission media are monolithically packaged on a board for constituting said plurality of

first driver circuit units, said plurality of second driver circuit units and said signal processing electronic circuit unit thereon.

11. The wavelength division multiplexed optical interconnection device according to claim 8, wherein said board further has a phase-locked loop circuit for controlling the transfer of the third electric signals outputted from said signal processing electronic circuit unit to said second driver circuits on its surface, and said second driver circuit units are placed on both sides of the phase-locked loop circuit along the periphery of said signal processing electronic circuit unit with the phase-locked loop circuit as the center.

12. A wavelength division multiplexed optical interconnection device comprising:

input circuit units including,

a substrate having a square surface and back;

a plurality of first optical transmission media;

a plurality of optical demultiplexers for respectively wavelength-demultiplexing wavelength-multiplexed lights inputted via said first optical transmission media;

a plurality of optical receivers for respectively receiving the wavelength-demultiplexed plural pieces of light therein and converting the same into first electric

signals; and

a plurality of first driver circuit units provided on the surface of said substrate in the neighborhood of said plurality of optical receivers and for respectively driving said plurality of optical receivers and amplifying the converted first electric signals to thereby output second electric signals;

output circuit units including,

a signal processing electronic circuit unit provided on a central surface of said substrate and for electrically processing the second electric signals;

a plurality of optical emitters for respectively converting third electric signals outputted from said signal processing electronic circuit unit to light;

a plurality of optical multiplexers for wavelength-multiplexing the pieces of light;

a plurality of second optical signal transmission media for sending out the wavelength-multiplexed light;

a plurality of second driver circuit units provided on the surface of said substrate in the neighborhood of said plurality of optical emitters and for respectively driving said plurality of optical emitters; and

a plurality of terminals provided on the back of said substrate,

wherein with a line for connecting the centers of

two opposite sides of said substrate surface and dividing the surface into two as a center line, said input circuit units are provided on the left side of the center line in a C-shaped fashion over the periphery of said substrate, and said output circuit units are provided on the right side of the center line in an inverted C-shaped fashion over the periphery of said substrate, said input circuit units, said signal processing electronic unit and said output circuit units are monolithically packaged on said substrate, and source voltages for operating said first driver circuit units, said signal processing electronic circuit unit and said second driver circuit units are respectively supplied from said plurality of terminals provided on the back of said substrate.